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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

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**TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371**

5509

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/509643

INTERNATIONAL APPLICATION NO.

PCT/DE98/02906

INTERNATIONAL FILING DATE

30 Sept. 1998

PRIORITY DATE CLAIMED

30 Sept. 1997

TITLE OF INVENTION A METHOD FOR SELECTING ONE OF SEVERAL RECEIVERS IN A
DIVERSITY RECEIVING SYSTEM

APPLICANT(S) FOR DO/EO/US

Hermann Link and Stefan Schradi

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information: International Preliminary Examination Report
Annexes to International Preliminary Examination Report
International Search Report
Request
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: Link et al. **GROUP:** Unknown
SERIAL NO: Unknown **EXAMINER:** Unknown
FILED: Herewith
FOR: A METHOD FOR SELECTING ONE OF SEVERAL
RECEIVERS IN A DIVERSITY RECEIVING SYSTEM

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

PRELIMINARY AMENDMENT

Preliminary to examination, please amend the above-identified application as follows:

IN THE CLAIMS:

Please amend the claims as follows:

Claim 3, line 1, delete "oder 2".

Claim 4, line 1, delete "1, 2 oder 3" and insert therefor -- 1 --.

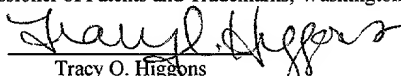
Claim 5, line 1, delete "einem d r vorangehenden Anspr che" and insert therefor --Anspruch 1 --.

Claim 7, lines 1 - 2, delete "einem der vorangehenden Anspr che" and insert therefor -- Anspruch
1 --.

Claim 8, lines 1 - 2, delete "einem der vorangehenden Anspr che" and insert therefor -- Anspruch
1 --.

CERTIFICATION UNDER 37 C.F.R.   1.10

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited
on the date shown below in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number
EL545276260US addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231.


Tracy O. Higgins

Date: 3-30-00

REMARKS

The present Preliminary Amendment is submitted in order to eliminate multiple dependencies in the claims.

Examination on the merits is respectfully requested.

Respectfully submitted,



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#3

**A METHOD FOR SELECTING ONE OF
SEVERAL RECEIVERS IN A DIVERSITY RECEIVER SYSTEM**

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The invention relates to a method for selecting one of several receivers in a diversity receiving system as well as a circuit arrangement for implementing the method.

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Diversity receiving systems with several receivers are used, for example, in vehicles. The receivers can be e.g. audio and video receivers.

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Reception and reproduction of video pictures in stationary receiving stations poses no difficulties, because the reception conditions remain largely constant. On the other hand, the reception conditions for a mobile receiving station can vary considerably, depending on the nature of the terrain. For instance, if the mobile receiving station is situated in mountainous terrain, echoes can cause considerable interference with reception; in the radio shadow of mountains or hills, the radio connection can even break down completely, so that, in place of a video picture, only noise is visible on the screen.

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In the meantime, motor vehicles such as e.g. passenger cars and long-distance buses, but also railroad cars, are being equipped with television receivers and screens, so that, on the one hand, messages can be displayed, for example traffic reports sent by video text, or, on the other hand, the travelers can be entertained with television programs. The receiving conditions in a moving receiving station vary considerably in some circumstances, due to the terrain through which the receiving station is currently passing. Consequently, this will subject the travelers who are watching television to unpleasant and considerable eye strain, because the picture quality can

vary to a great extent. For example, if the vehicle is passing through a radio shadow, the viewers will see only noise on the screen. Looking at a television program with such interference subjects the viewers to fatigue rather than to entertainment.

It is known that the reception of radio signals in mobile receiving stations can be improved by multi-path reception, called "diversity" in English. By antenna diversity is understood a receiver which can be connected to one of several antennas, generally spatially separated from one another, while by frequency diversity is understood a system consisting of several receivers which receive the same signals or the same programs on different frequencies. The signals delivered by the antennas in the case of antenna diversity and by the receivers in the case of frequency diversity are tested for their quality, so as to forward and process the best quality signal.

It is therefore the object of the invention to specify, for a diversity receiving system with several receivers, a method for selecting the receiver with the best reception.

The invention achieves this object by comparing the levels of the control signals of the automatic gain control of the receivers, and selecting that receiver whose control signal has the lowest level.

The invention starts from the idea that the level of the control signal of the automatic gain control of a receiver, e.g. a television receiver, is a measure of the reception level. If the level of the control signal reaches its maximum, the reception level is too low; on the other hand, if the level of the control signal reaches its minimum, the reception level lies in the optimum range.

Figure 1 shows a first embodiment of the invention,

Figure 2 shows a second embodiment of the invention.

The invention will now be described and explained by means of its first embodiment, shown in Figure 1.

Two receivers E1 and E2, e.g. television receivers, receive the same program, with an antenna A1 and A2 respectively. The two control signals AGC1 and AGC2 of the two receivers E1 and E2 are compared in a comparator VL. By means of the controllable changeover switch U, the comparator VL selects the output of that receiver whose control signal has the lower level.

Consequently, the output signal S of the receiver whose control signal has the lower level is always forwarded for further processing. More than two receivers can also exist here.

The second embodiment of the invention, shown in Figure 2, will now be described and explained.

The second embodiment differs from the first one in that the output of the comparator VL is not connected to the control input of the controllable changeover switch U, but to the first control input of a block synchronizer BS. The output signal S of one of the two receivers E1 or E2 is conducted to the second control input of the block synchronizer BS. The control output of the block synchronizer BS is connected to the control input of the controllable changeover switch U.

The second embodiment of the invention is suited for the block transmission of signals.

The block synchronizer BS receives from the comparator VL a control signal for switching over to one receiver if the level of the control signal of the other receiver becomes greater than the level of the control signal of the first receiver. However, the block synchronizer BS does not switch

over to another receiver immediately, but only at the end or beginning of a block. In other words, this means that the block synchronizer BS executes switchover processes with block synchronization. No switchovers are executed within a block.

The second embodiment is especially well suited for a diversity receiving system with television receivers. The switchover process from one receiver to another takes place with line or picture synchronization.

With a third advantageous embodiment of the invention, switchover to another receiver occurs only if the lowest level differs from the levels of the other control signals by a specific minimum value. This measure of providing a hysteresis prevents unnecessary switchover processes.

A special advantage of the invention is that the control signal is present in any case, and the invention can be implemented with only small expense - only a comparator and a controllable changeover switch are needed.

The invention is not limited to television receivers. It is suited for receivers of all kinds for diversity receiving systems. The invention is especially suited for mobile diversity receiving systems, such as are installed e.g. in vehicles. This can apply to audio and/or video receiving systems. A future application for digital audio transmission is also conceivable.

CLAIMS

- 1 1. A method for selecting one of several receivers, (E1, E2) of a diversity receiving
2 system, characterized in that the levels of the control signals (AGC1, AGC2) of the automatic
3 gain control of the receivers (E1, E2) are compared with one another, and that receiver is
4 selected whose control signal has the lowest level.
- 1 2. The method of Claim 1 characterized in that a switchover to another receiver occurs
2 only if the level of its control signal lies below the level of the other control signal by a
3 specifiable minimum.
- 1 3. The method of Claims 1 or 2, characterized in that a mobile diversity receiving system
2 is involved.
- 1 4. The method of Claims 1, 2, or 3 characterized in that the receivers are audio and/or
2 video receivers.
- 1 5. The method of one of the preceding Claims, characterized in that, if the reception
2 signals are transmitted in blocks, switchover from one receiver to another occurs between two
3 blocks.
- 1 6. The method of Claim 5, characterized in that, in a diversity receiving system with video

2 receivers, switchover from one video receiver to another one occurs with line or picture
3 synchronization.

1 7. A circuit arrangement for implementing the method of one of the preceding claims,
2 characterized in that the outputs of several receivers (E1, E2) for the control signal (AGC1,
3 AGC2) of the automatic gain control are connected to the inputs of a comparator (VL), whose
4 output is connected to the control input of a controllable changeover switch (U), and that the
5 signal outputs of the receivers (E1, E2) are connected to the inputs of the controllable
6 changeover switch (U), at whose output is present the output signal (S) of the selected receiver.

7 8. A circuit arrangement to implement the method of one of the preceding claims,
8 characterized in that the outputs of several receivers (E1, E2) for the control signal (AGC1,
9 AGC2) of the automatic gain control are connected to the inputs of a comparator (VL), whose
0 output is connected to the first control input of a block synchronizer (BS), and that the control
1 output of the block synchronizer (BS) is connected to the control input of a controllable
2 changeover switch (U), and that the signal outputs of the receivers (E1, E2) are connected to
3 the inputs of the controllable changeover switch (U), whose output is connected to the second
4 control input of the block synchronizer (BS), and that the output signal (S) of the selected
5 receiver can be tapped from the output of the controllable changeover switch (U).

1 9. The circuit arrangement of Claim 8, characterized in that the receivers (E1, E2) are
2 television receivers and that the block synchronizer (BS) controls the line or picture

3 synchronization.

Abstract of the Disclosure

1. A method for selecting one of several receivers of a diversity receiving system.

2.1 In a diversity receiving system with several receivers, a criterion is needed for
5 selecting the receiver with the best reception conditions.

2.2 So as to select the receiver with the best reception conditions, the levels of the
control signals (AGC1, AGC2) of the automatic gain control of the receivers (E1, E2) are
compared with one another in a comparator (VL), and that receiver is selected whose control
signal has the lowest level.

2.3 The invention is suited for diversity receiving systems with several receivers,
especially for mobile systems.

3. Figure 1



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DECLARATION AND POWER OF ATTORNEY

We, the below named inventors, hereby declare that:

Our residences, post office addresses, and citizenships are as stated below next to our respective names.

We believe we are the original, first, and joint inventors of the subject matter which is claimed and for which a patent is sought on the invention entitled A METHOD FOR SELECTING ONE OF SEVERAL RECEIVERS IN A DIVERSITY RECEIVER SYSTEM, the specification of which was filed with the United States Patent and Trademark Office on March 30, 2000, as Serial No. 09/509,643, which claims priority to international application PCT/DE98/02906 filed September 30, 1998; and

We hereby state that we have reviewed and understand the contents of the above identified specification, including the claims.

We acknowledge the duty to disclose information which is material to patentability in accordance with Title 37, Code of Federal Regulations, Section 1.56.

We hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate filed by us on the same subject matter having a filing date before that of the application on which priority is claimed: PCT/DE98/02906, international application filing date September 30, 1998.

We hereby declare that all statements are made hereby of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And we hereby appoint:

Maurice E. Gauthier	-	Reg. No. <u>20,798</u>
Richard L. Stevens	-	Reg. No. <u>24,445</u>
Matthew E. Connors	-	Reg. No. <u>33,298</u>
William E. Hilton	-	Reg. No. <u>35,192</u>
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Steven M. Mills	-	Reg. No. <u>36,610</u>
Anthony P. Onello, Jr.	-	Reg. No. <u>38,572</u>
Richard J. Stevens, Jr.	-	Reg. No. <u>44,357</u>

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all of the firm of Samuels, Gauthier & Stevens, our attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

We request that all correspondence be directed to:

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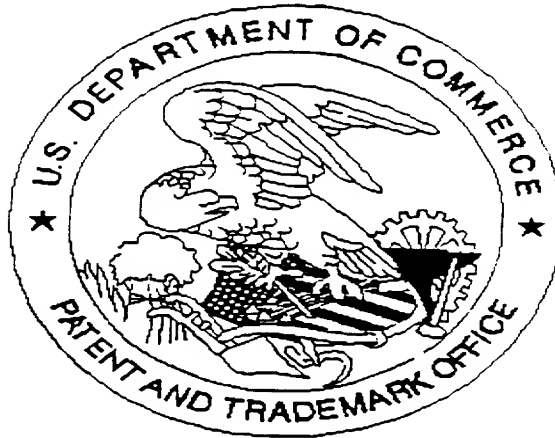
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